

# FOSS

# Solids and Liquids

## Concept and Lesson Map



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# FOSS Concept and Lesson Map: Solids and Liquids

## The Big Picture

This unit provides experiences that heighten students' awareness of the physical world. Matter with which we interact exists in three fundamental states: solid, liquid, and gas. In this unit, first graders have introductory experiences with two of these states of matter: solid and liquid. The three "Big Ideas" for this unit are (1) Matter has observable properties; (2) solids keep their shape; (3) liquids take the shape of their container.

### Eliciting Student Ideas

Goal: Uncovering student ideas about matter.

Use "new" assessment, given pre-and post-instruction that assesses each of the "big ideas"

### Investigation 1: Solids

Goal: Solid materials have properties that separate them from other states of matter and maintain their shape regardless of the container they are in.

#### Part 1:

##### Introduce Solids

Students are introduced to a variety of solid materials (cloth, wood, plastic, paper, rubber) and describe the properties of the objects.

IQ: How can solids be described?

#### Part 2:

##### Sort Solid Objects

Students sort a set of solid objects in a variety of ways to discover similarities among the solids.

IQ: In what ways are some solids the same?

#### Part 3:

##### Construct with Solids

Students use solid materials to build structures (towers, bridges, tunnels), finding the best materials to use for each application.

IQ: How can the properties of solids be used?

### Investigation 2: Liquids

Goal: Liquids take the shape of the part of the container they occupy. Liquids can pour, soak into things, fill containers to a level, and are flat on top.

#### Part 1:

##### Liquids in Bottles

Students investigate the properties of seven liquids (water, corn syrup, liquid detergent, liquid hand soap, oil, fabric softener, and colored water) at a station.

IQ: How do liquids differ from each other?

#### Part 2:

##### Properties of Liquids

Students describe properties of liquids and develop more precise vocabulary. Vocabulary is practiced with a card game.

IQ: How do liquids differ from each other?

#### Part 3:

##### Liquid Level

Students observe the liquid surface in containers as water is added and as they are tipped to observe that the liquid surface remains level.

IQ: How does the level of a liquid surface change as the bottle tips?

### Investigation 3: Bits and Pieces

Goal: Particles of solid materials can pour like liquids, but unlike liquids they maintain their shape.

#### Part 1:

##### Solids in Containers

Students investigate the properties of solid materials: cornmeal, rice, and three different beans one at a time by pouring them from one container to another.

IQ: Are these materials solids or liquids?

#### Part 2:

##### Separating Soup Mix

Students use screens of three sizes to separate a mixture of five solid materials.

IQ: How can mixtures of solid particles be separated?

#### Part 3:

##### Solids in Bottles

Students use funnels to put the five solid materials into clear bottles with caps. They observe how the particulate materials look, sound, and move when they shake and roll the bottle.

IQ: How do particles of solids move in bottles?

#### Part 4:

##### \*Separating Beads with a Screen (optional)

Students work with representational materials to demonstrate their understanding of the use of screens to separate mixtures.

IQ: How do you know which screens to use for separating a mixture of solids?

### Investigation 4: Solids and Liquids with Water

Goal: When solids and liquids are mixed, the solid might change, the liquid might change, both might change, or sometimes neither changes.

#### Part 1:

##### Solids and Water

Students observe and discuss the changes that occur to mixtures and attempt to return the solids to their starting condition by drying.

IQ: What happens when different solids are mixed with water and how can they be separated?

#### Part 2:

##### Liquids and Water

Students observe changes that occur to mixtures, then tip the bottles gently, and finally shake them vigorously. The results are observed and recorded after a day of settling.

IQ: What happens when water is mixed with different liquids?

#### Part 3:

##### Toothpaste Investigation

Students apply their knowledge of solids and liquids to determine if toothpaste is solid or liquid.

IQ: Is toothpaste a solid, a liquid, a mixture, or some other form of matter?

### POST-Assessment

Use "new" assessment, given pre-and post-instruction that assesses each of the "big ideas"